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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,230

06/16/2006

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EXAMINER

KWAK, DEAN P

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

04/02/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,230	<b>Applicant(s)</b> JOUSSE, FABIEN FREDERIC	
	<b>Examiner</b> Dean Kwak	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/31/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “**50,000 microfluidic reactors**” (Claim 3) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2 & 3 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for “first and second microfluidic reactors”, does not reasonably provide enablement for “1,000 microfluidic reactors” (Claim 2) or “50,000 microfluidic reactors” (Claim 3). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification is not enabling because it is not clearly stated how 1,000 or 50,000 reactors and channels are being connected.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (WO 01/28670).

Regarding Claim 1, Allen et al. disclose a microfluidic system (e.g., microfluidic mixer, P3/L19-20 & Fig. 1 (100)) comprising:

- first and second fluid supply sources (e.g., first fluid and second fluid, respectively, P13/L19-20 & Fig. 6 (602, 604)),
- the first and second supply sources supplying first and second microfluidic reactors (e.g., mixers, P13/L22-23 & Fig. 6 (606, 608)) via an upstream channel (e.g., nozzle channels, P4/L17-18 & Fig. 2a (222, 224)), and
- the first and second reactors each having at least one downstream channel (e.g., exit channels, P13/L26, Fig. 6 (610, 612, 614)).

Regarding the resistance of its upstream channel at least 10 times larger than the downstream channel, it is noted that the channel width L and width b of the upstream channels are smaller than the downstream channels (see Fig. 2a & Claims 15, 21, 22, 26, 27). Therefore, while mixing the same viscosity fluids and the surface of each channels and reactors are made of same material with same surface smoothness, it will inherently display the flow resistance of all the upstream channels of the reactors is higher than the flow resistance in the down stream channels, see MPEP § 2112.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the channel(s) to increase the resistance of upstream channels at least 10 times larger than the resistance of the downstream channels to change the flow rate to modify mixing and reaction rate of fluids.

Regarding Claims 2 & 3, Allen et al. disclose all of the claim limitations as set forth above. While Allen et al. fail to disclose the number of microfluidic reactors, it is noted that by use of many parallel microfluidic devices, the recited limitation can be met. In addition, it would have been obvious to one having ordinary skill in the art at the time the invention was made to connect a plurality of microfluidic devices, since it has been held that forming in one piece an article which has formerly been in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1993). Further, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use 1,000 or 50,000 microfluidic reactors to study multiple reactions in parallel.

Regarding Claims 4, 6 Allen et al. disclose all of the claim limitations as set forth above. In addition, Allen et al. disclose the resistance of its upstream channel at least 100 times larger or higher than the downstream channel, it is noted that the channel width L and width b of the upstream channels are smaller than the downstream channels (see Fig. 2a & Claims 15, 21, 22, 26, 27). Therefore, while mixing the same viscosity fluids and the surface of each channels and reactors are made of same material with same surface smoothness, it will inherently display the

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flow resistance of all the upstream channels of the reactors is higher than the flow resistance in the down stream channels, see MPEP § 2112.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the channel(s) to increase the resistance of upstream channels at least 100 times larger than the resistance of the downstream channels to change the flow rate to modify mixing and reaction rate of fluids.

Regarding Claim 5, Allen et al. disclose all of the claim limitations as set forth above. In addition, Allen et al. disclose a microfluidic system wherein the microfluidic reactors are all identical (see identical reactors in Fig. 6 (606)).

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zarur et al. (PG Pub 2003/0077817) disclose a microfluidic device with 1,000 or more reaction chambers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dean Kwak whose telephone number is 571-270-7072. The examiner can normally be reached on M-TH, 5 am - 3:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

24Mar09

/D. K./  
Examiner, Art Unit 1797

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797